APPENDIX F

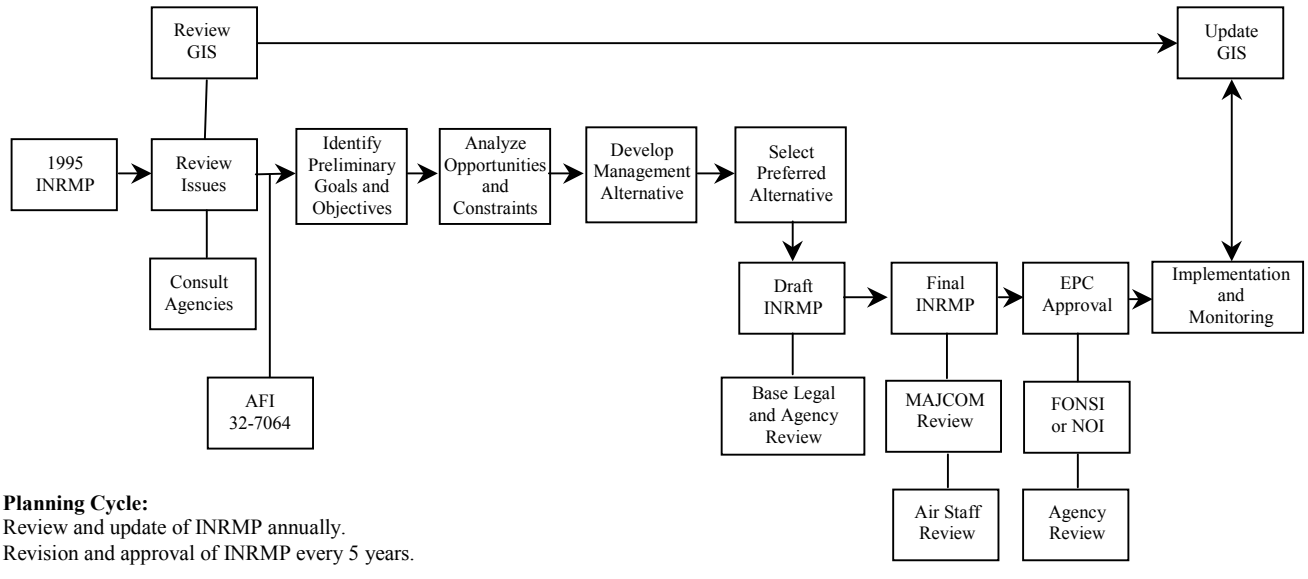
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN – Robins, AFB

General Information

The Integrated Natural Resources Management Plan (INRMP) is both a comprehensive guide to resource management and a "living document," subject to modification as new information and policies come to bear on it. Robins Air Force Base (AFB) personnel must take its goals and objectives into consideration when planning projects and mission changes. This plan will be implemented via the Robins AFB annual work plan process, which is envisioned as including appropriate integration of natural resources-related information from component programs and appropriate information from the environmental management website.

Individual work plans reflect the various component plans and determine how the natural resource management goals and objectives are to be achieved. The work plans supplement the INRMP and provide the implementation details for the various natural resource management initiatives.

The Robins AFB component programs provide individual component plans for the management of specific natural resources on the Base. These plans are incorporated by reference and will be available, along with this INRMP, on the environmental management website (www.em.robins.af.mil). The key component plans include: 1)*Threatened and Endangered Animal Species Survey*, March 2000, 2) *Rare Species and Natural Communities Survey*, 1994, 3) *Rare Plant Survey and Management Plan*, April 1999, 4) *Invasive Plants Management Plan*, September 1999, 5) *Tree Management Plan*, January 1995, 6) *Upland Forest Survey*, March 1998, 7) *Wetland Protection Plan*, July 1999, 8) *Robins AFB BASH Plan*, January 1999, 9) *A Critical Review of the Pesticide Reduction Program at Robins AFB, GA*, 1997, 10) *Outdoor Recreation Facility Mapping*, October 1998.



Integrated Natural Resource Planning Process at Robins Air Force Base.

Management Philosophy

The INRMP is a tool to guide both short-term and long-range resource management activities integrated with the mission and the Base comprehensive planning process. The INRMP was developed using interdisciplinary input and is to be included in all planning activities at Robins AFB. It serves as a decision-making tool for commanders on environmental issues, and serves as the basis of natural resources management.

The INRMP is to be used with the comprehensive Robins AFB geographic information system (GIS) resource maps, which also include land classifications (see, for example, Appendix A). Keeping the GIS up to date with new resource information as it is developed will enhance the plan's effectiveness. Other organizations including the Civil Engineering Group (CEG) will be using the GIS, and its expansion will further enhance the planning for and management of natural resources at Robins AFB.

This INRMP, when approved by the Base's natural resources manager, the Environmental Protection Committee (EPC), and the Major Command (MAJCOM), will serve as the overall guide to management of natural resources. The natural resource manager has the principal role in carrying out the goals and objectives of the INRMP and will monitor all management strategies and adjust them as needed.

Purpose and Use of Plan

This INRMP for Robins AFB, Georgia, clarifies, revises, and builds on the 1995 *Integrated Natural Resource Management Plan*, and further builds on the 1989 *Natural Resources Plan*. The 1995 and 1989 plans should be consulted for more detailed information regarding particular resources and ongoing management activities at the Base.

This INRMP incorporates the following:

- Many of the goals, objectives, and implementation measures in the 1989 and 1995 plans;
- Resources information from the Base's GIS on natural resources planning and management; and
- Consolidation of natural resource planning information into one overall document.

The INRMP is based on an interdisciplinary approach to the conservation and ecosystem management of natural resources on Robins AFB. The plan is site-specific in cases where management actions are to occur in specific areas and sets forth overarching management goals, practices, and guidelines that address similar areas Basewide. In accordance with the Sikes Act (USC Title 16, Chapter 5C, Subchapter I, Conservation Programs on Military Installations), this INRMP is the primary driver for enforcement of natural resources laws and regulations.

Authority

The INRMP adheres to the guidelines set forth in Air Force Instruction (AFI) 32-7064, *Integrated Natural Resources Management*. AFI 32-7064 explains how to manage natural resources on Air Force (AF) property in compliance with federal, state, and local standards and implements the following: Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*; Department of Defense Directive (DODD) 4700.4, *Natural Resources Management Program* (24 January 1989); DOD 7000.14-R, Volume IIA, *Reimbursable Operations Policy and Procedures* (September 1997) and Department of Defense Instruction (DODI) 4715.3 *Environmental Conservation Program* (3 May 1996). DODI 4715.3 implements policy, assigns responsibilities, and prescribes procedures for the integrated management of natural resources. AFI 32-7065, *Cultural Resources Management,* sets guidelines for protecting and managing cultural resources. Applicable laws, regulations and other directives that guide integrated natural resource management at Robins AFB are listed in Appendix B.

Plan Structure

This document presents background information first, including management philosophy, plan purpose and authority, use, plan structure, installation history and military mission and impacts, the physical setting,

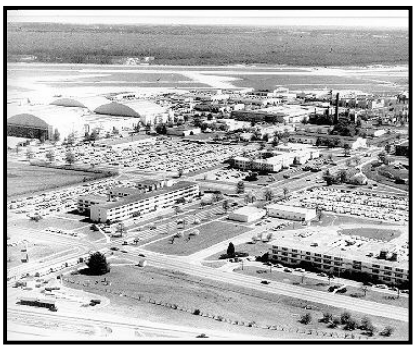
and a summary of natural resources including fish and wildlife, plants, water, land, people, and program management. The second section summarizes primary management goals, resource management issues, and management objectives. The last section summarizes management implementation. Terms are defined following the text references. Resource maps, plant and animal species lists and policy letters are provided in Appendices A, C, and D, respectively.

Installation Location

Robins AFB is located approximately 15 miles south of Macon, Georgia, and 90 miles southeast of Atlanta. It is located in Houston County, adjacent to the eastern city limits of the town of Warner Robins. Its western boundary runs parallel and adjacent to Georgia State Highway 247.

Installation History

The forerunner of Robins AFB was the Wellston Air Depot, which was activated at the small town of Wellston, population 50. Early in 1941, Macon civic leaders, with the help of Congressman Carl Vinson, persuaded the Army Air Corps to establish a maintenance and supply depot in adjoining Houston County 18 miles south of Macon. The city of Macon and Bibb County purchased 3,000 acres with $100,000 from bonds, and donated the land to the federal government. In 1941 the area around the original tract of 3,108.5 acres established for the Army Air Corps Depot was primarily undeveloped. The Base was established on land that had few agricultural attributes, much of which was covered by wetlands. All of the upland soils were disturbed, and portions of the wetlands were filled to establish a level land area to construct the buildings and runways needed to conduct the mission of the Army Air Corps.



Construction was completed on March 14, 1942, and Wellston Depot was officially activated. Through its history the Base and its Commands have had a series of names, all reflecting its logistical mission: Wellston Army Air Depot, Warner Robins Air Depot Control Air Command, Warner Robins Air Technical Service Command, Warner Robins Air Material Area. On April 1, 1974, the Base was named Warner Robins Air Logistics Center, WR-ALC.

The four decades following World War II were years of challenge and tremendous growth for Robins Air Force Base. The world had entered an era of uneasy peace broken by conflicts that required more and more logistics support. The changing requirements of a jet age Air Force added a new dimension to the challenge, leading to the growth of the Commands and the Base. Today the Warner Robins ALC and Robins AFB is the state's largest industrial facility employing over 4,000 military and over 13,000 civilian employees. Robins is home to over 40 organizations including the Warner Robins ALC, Headquarters Air Force Reserve (HQ AFRES), the 19th Air Refueling Wing (19ARW) or "Black Knights," 5th Combat Communications Group (5CCG), 93rd Air Control Wing (93 ACW) (Joint STARS), and the 116th Bomb Wing (116BW) of the Air National Guard (B-1B).

Military Mission and Impacts

The basic mission of WR-ALC has not changed since its beginnings in 1941. The primary task of the Center is to maintain Air Force aircraft and their components. The methods of meeting this responsibility have changed only in the equipment itself and the complexity of the workload. Under the guidance of WR-ALC, the Center carries out repair, maintenance, supply, and other related logistics functions. Further discussion regarding the Base, major units, and major tenant missions may be integrated from the Robins website (www.robins.af.mil).

Because a large proportion of the Robins AFB area is undeveloped, part of the planning for current and future missions involves grouping related functions together and separating incompatible ones. Another part is maintaining, preserving, and enhancing both the human environment and the natural resources. The Environmental Management Directorate (EM) charged with the latter goal, is responsible for preparation of this INRMP. Its mission is to restore, protect, and foster respect for the environment to ensure the continued mission of Robins AFB.

The primary impacts on natural resources are those related to:

- Past land management practices
- Current operation and maintenance of grounds and facilities
- Construction of new facilities to accommodate mission changes.

Past solid waste and other management practices involving hazardous materials have resulted in sites that are presently undergoing study and remediation under the Installation Restoration Program (IRP) to identify and reduce potential impacts to natural resources. Intensive ground training activities and aircraft operations (including BASH control) are the current mission activities with the greatest potential to impact natural resources. New facility construction to support future mission changes will require the development of additional land with associated effects on the natural environment.

The natural resources manager reviews proposed projects as appropriate under National Environmental Policy Act Compliance (AFI 32-7061) and the Environmental Impact Analysis Process (AFI 32-202).

Geography and Topography

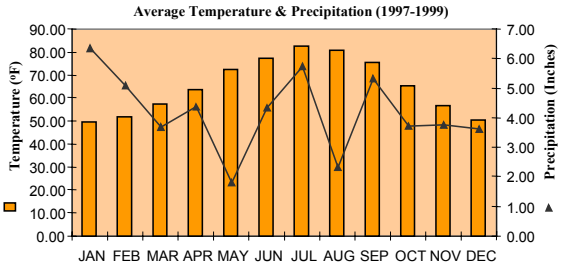
Robins AFB lies along the upper margin of the Coastal Plain 20 miles southeast of the Fall Line, which separates the more resistant crystalline rocks of the Piedmont from the less resistant unconsolidated deposits of the Coastal Plain. The Base is located on the low alluvial terrace of the Ocmulgee River. The Base slopes generally eastward, between elevations of about 300 feet mean sea level (msl) on the west and 240 feet msl on the east. Much of the area bordering the eastern side of the Base is low-lying swampland, and parts of the Base have been constructed over filled wetlands. Robins AFB lies within the Upper Coastal Plain near the borders of the Piedmont and Lower Coastal Plain physiographic provinces (Appendix A, Figure 1). This positioning affords a mixture of lower piedmont, upper coastal plain, sandhill, and lower coastal plain habitats. Information regarding the Base and surrounding communities, as well as nearby natural areas, may be integrated from the EM website (www.em.robins.af.mil).

Climate

The climate of Robins AFB is influenced by the Gulf of Mexico and the Atlantic Ocean, and by the Appalachian Mountains to the northwest. Warm moist air masses originating from the Gulf and the Atlantic Ocean cause high precipitation in the area and high humidity year-round. The weather is warm and humid during most of the summer.

Temperatures of 90° F or higher can be expected on 3 out of 4 days in June, July, and August, and temperatures of 100° F or higher occur an average of 5 to 7 days each summer. The winters are generally

mild; daily low temperatures of 32° F or below occur on average about 35 days each winter, in several short periods mostly from December through February. The average growing season is about 250



days. Average yearly rainfall near the Base is between 35 and 45 inches. March and July are normally the wettest months, each averaging more than 5 inches. Fall is the driest part of the year, but no month has an average of less than 2 inches. Occasionally, there are tornadoes, and some of the more severe local thunderstorms are accompanied by damaging winds. The average relative humidity ranges from 80 to 90 percent in the morning and from 43 to 63 percent early in the afternoon.

Geology

Geologic units ranging from Cretaceous to Quaternary, typically unconsolidated, have been described in the Warner Robins area. Older Cretaceous units are encountered to depths of approximately 1,700 feet, underlain by crystalline basement rocks (Appendix A, Figure 2). Geologic units consist of Cretaceous Ripley and Providence Sand, Eocene Undifferentiated Sands, and Quaternary Alluvium. Most of the site is immediately underlain by alluvial deposits of the Ocmulgee River. The depth to consolidated deposits is presumed to be at least 1,700 feet. The western half of the Base is sandy alluvial deposits; the eastern part is underlain by peat and fine-grained organic silt deposits.

The groundwater hydrology of the Warner Robins area has been reported by LeGrand (1962) and by the Georgia Geologic Survey (Sonderegger et al. 1978; Thomson et al. 1956). Groundwater is found beneath Robins AFB under both water table and artesian conditions. The water table is present throughout the Base at shallow depth in the upper sandy alluvial deposits. The water table discharges to the east and contributes to the development of a swampy area extending to the Ocmulgee River. There appears to be a confining bed just below the swamp deposits, which would create weak artesian conditions immediately below this upper layer. Both the land surface and the confining beds are inclined towards the southeast, but the inclination of the beds is steeper. Further discussion regarding the general physical environment may be integrated from the EM website (www.em.robins.af.mil).

Soils

Sixteen soil units and nine complexes are mapped on Robins AFB. The soils at Robins AFB were mapped in 1987, and a soil survey was conducted by the NRCS in 1989. Information on specific management practices for soils mapped on the Base and limitations and potentials of each soil can be found in the NRCS Soil Survey. In general, all undeveloped soil types on Robins AFB, including both wetland and upland soils, are suitable for wildlife food plants and protective cover vegetation (Appendix A, Figure 3). Additionally, soils at Robins AFB are not very erodible.

Fish and Wildlife

Horse Creek and Sandy Run Creek, tributaries of the Ocmulgee River, provide most of the stream habitat at Robins AFB. Horse Creek is a small bottomland stream draining marshland in the northeastern portion of the Base. Sandy Run Creek, a significantly larger drainage, marks the southern boundary of the Base.

These streams provide habitat for fish, reptiles, and amphibians and for many species of aquatic invertebrates. Fishes likely to utilize stream habitat at

Robins AFB include lamprey, minnow, sucker, catfish, madtom, killifish, bass, sunfish and darter (Appendix C). Both aquatic stream habitat and stream banks and margin areas are used by aquatic and semi-aquatic turtles, including the common snapping turtle, loggerhead musk turtle, eastern mud turtle, and yellowbelly slider. Also utilizing this habitat are semi-aquatic snakes, including the eastern cottonmouth and banded water snake.

Stream habitat at Robins AFB also is used by mammals, such as muskrat and beaver, and by birds, (mostly waterfowl). Horse Creek, Sandy Run Creek, and the Ocumulgee River provide valuable floodplain habitat which, when flooded, provides ideal foraging and rearing habitat for many fish species. Temporary ponds located on the floodplain margins provide habitat for frogs, toads, and salamanders to breed and raise their young.

The highest diversity of animals on Robins AFB occurs in the southern and eastern sections, in undeveloped bottomland and transitional forest associated with the floodplains of Sandy Run and Horse Creeks and the Ocmulgee River. In these relatively undisturbed areas, a mosaic of numerous hydric and semi-hydric communities provides over 2,000 acres of excellent wildlife habitat for mammals, birds, reptiles, amphibians, as well as invertebrates. Much of the wildlife inhabiting these highly productive ecosystems lives on the Base year-round. In addition, there are approximately 300 acres of upland forest consisting of mixed hardwood-pine-forests and loblolly pine plantations that provide additional wildlife habitat. Plant and animal species recorded during wildlife surveys by the NRCS in 1989 and GA DNR in 1993-1994 are listed in Appendix C. A more thorough discussion of biological diversity is provided in the "Plants" section of this INRMP.

Three biological surveys for federal and state endangered, threatened, or rare animal species have been conducted on Robins AFB (NRCS 1989, GA DNR during 1993 and 1994, and Earth Tech 2000). No federal or state endangered or threatened animal species were found on the Base, except for the American alligator which is listed because of similarity of appearance to the American crocodile. Bald eagles have been observed flying over the airfield.

Plants

Robins AFB is located partly on a terrace and partly on bottomland of the Ocmulgee River. Upland pine forests, upland hardwood forests, and alluvial wetlands define the coastal plain ecosystem near the Base.

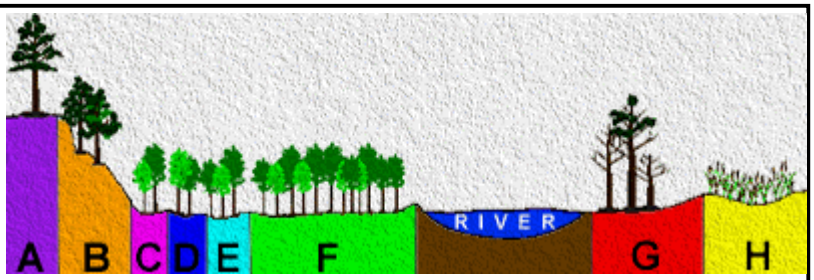
Upland pine forests dominated by trees such as longleaf pine (*Pinus palustris*) and loblolly pine (*P. taeda*) occupy elevated areas of the coastal plain on coarse-textured soils. Upland hardwood forests dominate some coastal plain sites, particularly on fertile soils without periodic fires. Dominant trees include southern magnolia (*Magnolia grandiflora*), American beech (*Fagus grandiflora*), various species of oaks, sweetgum (*Liquidambar styraciflua*), and loblolly pine.

The existing natural vegetation on Robins AFB may be divided into three general associations or cover types (Appendix A, Figure 4): (1) upland forest, (2) bottomland forest, and (3) transitional forest. Bottomland forest is the largest vegetation cover type on Base lands, occupying a total of 2,238 acres in 10 delineated areas, mostly in the southern and eastern sections of the Base (Appendix A, Figure 5). Upland forest amounts to 291 acres in 7 areas, primarily in the southeastern section of the Base. A detailed description of the bottomland forests, upland forests, transitional forests, and urban, timbered, and planted pine cover types is included in the 1995 INRMP (Section 5.2). In addition to the natural cover types,

Rare Plant Species found at Robins AFB. "Clockwise from right: Ocumulgee skullcap, Oval ladies-tresses, Awned meadowbeauty"

artificial vegetation cover types have been mapped and include planted pine, timbered areas, turf grass and golf course, and general field areas. Non-natural cover types (Appendix A, Figure 11) are described in the "Land" section of this INRMP.

The GA DNR identified eight significant natural communities on Robins AFB during its field surveys in 1993 and 1994 (Appendix A, Figure 6): (1) relict successional longleaf pine forest, (2) relict upland hardwood bluff forest, (3) gum pond, (4) bay swamp, (5) gum-cypress pond, (6) old growth bottomland hardwood swamp, (7) creek forest, and (8) Grady freshwater meadow. Four of the eight significant community types (old-growth bottomland hardwood swamp, bay swamp, creek swamp, and gum-cypress pond) are located primarily in bottomland forest; the other four in transitional and upland forests. A detailed description of each of these natural community types is provided in the 1995 INRMP (Section 5.4).



A - LONGLEAF PINE FOREST
B - UPLAND HARDWOOD BLUFF
C - GUM POND
D - BAY SWAMP
E - GUM CYPRESS POND
F - BOTTOMLAND HARDWOOD SWAMP
G - CREEK FOREST
H - GRADY FRESHWATER MEADOW

Surveys for federal and state endangered, threatened, or rare plant species were conducted on Robins AFB in 1989, 1993 and 1994, and in 1998-1999 (NRCS 1989, GA DNR 1994, Earth Tech 1999). Comprehensive plant lists from these investigations are provided in Appendix C. Ten state-listed rare plant species are present on the Base including two protected species, Ocmulgee skullcap (*Scutellaria ocmulgee*), and Harper's Wild Ginger (*Hexastylis shuttleworthii var. harperi*).

Water

Robins AFB, in the drainage basin of the Ocmulgee River, known as the Altamaha Basin, is drained by four unnamed intermittent creeks flowing from west to east into Horse Creek, which flows in a southeasterly direction to the Ocmulgee River (Appendix A, Figure 7). The direction of surface flow is from west to east, into one of the intermittent creeks or the wetlands on the eastern side of the Base. The stream, pond, and wetland habitats on Robins AFB are hydraulically interconnected and dynamic systems that change seasonally with precipitation and corresponding fluctuations in surface and ground water levels (Appendix A, Figure 8). Detailed information regarding the aquatic habitats and fish populations on the Base is included in the 1995 INRMP (Section 5.3).

Horse Creek and Sandy Run Creek provide most of the stream habitat at Robins AFB (Appendix A, Figure 8). Horse Creek is a small bottomland stream draining marshland in the northeastern portion of the Base. Sandy Run Creek, a significantly larger drainage, marks the southern boundary of the Base. Both creeks are tributaries of the Ocmulgee River and provide habitat for fish, reptiles, and amphibians and for many species of aquatic invertebrates.

There are three constructed lakes on Robins AFB and all are stocked with fish. Duck Lake (8.34 acres) is located centrally on the Base and is surrounded by a mosaic of upland forest and the trimmed grasses of residential housing along the southern shore and a golf course along the northern shore. Luna Lake (7.70 acres) is open-water habitat used primarily for recreation. Scout Lake (22.36 acres), once connected

to the wetlands, has been converted to limnetic habitat. This lake now is artificial open-water habitat.

Both perennial and ephemeral pond habitats are present on Robins AFB. The permanent artificial ponds primarily provide habitat for fish and turtles. Semi-aquatic snakes utilize pond banks and margin habitats. The ephemeral ponds created by rains and the seasonal flooding of the rivers and streams provide extensive aquatic habitat. A gum-cypress pond, created by the dam-building activities of beaver, located at the base of the upland hardwood bluff along Fort Valley Street provides aquatic habitat for frogs, toads, and turtles. In addition to the gum-cypress pond, there are several other ephemeral ponds associated with unique plant communities.

Inland wetlands are found near streams and rivers. Vegetation types within alluvial wetlands, which vary in response to the frequency of inundation, are classified into five zones on this basis: (1) plant communities that occupy permanent water courses and impounded areas, (2) river/swamp forests that are semi-permanently flooded throughout the year, (3) lower hardwood swamp forest, where soils are saturated 40-50 percent of the year, (4) forests in backwater and flat areas that are saturated only 20-30 percent of the year, and (5) transition to upland areas, with soils that are generally saturated less than 15 percent of the year. Wetlands are classified according to the USFWS National Wetland Inventory on the basis of vegetation type, topography, and hydrologic regime. One of the five major wetland systems recognized by USFWS, the palustrine, dominates at Robins AFB. Palustrine designates a shallow, standing-water marsh environment, including swamps and bogs. All of the wetland communities on Robins AFB fall within the palustrine, or marsh-like, category.

Wetlands occur on many of the semi-improved and unimproved tracts of land on Robins AFB (Appendix A, Figure 9). The most recent study undertaken to delineate and quantify the jurisdictional wetlands located on the Base was in 1999 (*Final Wetland Delineation for Warner Robins Air Logistics Center*) and was conducted in accordance with the criteria set forth in the Technical Report Y-87-1, Corps of Engineers, Wetlands Delineation Manual (1987 Federal Manual). This report should be consulted for further information, including detailed maps showing wetland perimeters.

Land

The Geographic Information System (GIS) developed for Robins AFB, which incorporates files from the Base Civil Engineer Group (CEG), indicates that the installation encompasses 7,070 acres. The classes and acreages can be seen on the GIS maps for Robins AFB. The Land Use map is provided in Appendix A, Figure 10, and is derived from the turf management, recreation, vegetation association, and hydrography data layers. Land use categories are defined by the major grounds categories: improved, semi-improved, and unimproved. Improved grounds (3,696 acres) are covered by housing, administrative, and industrial facilities; parks, playgrounds, and athletic fields; and parade grounds and golf courses, as defined in AFI 32-7064. Semi-improved grounds (412 acres) are open fields. Unimproved grounds (2,961 acres) include the following categories, as defined in AFI 32-7064: agricultural outleased land, commercial forestry land,

wooded stream corridors, and wetlands. At Robins AFB, the unimproved grounds are mostly wetlands. However wetlands occur on many of the semi-improved tracts of land as well. Wetlands are

described in the "Water" section of this INRMP. Outdoor recreation opportunities are described in more detail in the "People" section of this INRMP.

There are eight turf management areas on the Base (Appendix A, Figure 11). These areas include semi-improved, improved and enhanced areas, the golf course and airfield, firebreaks, construction and vegetation control areas. Turf types on the Base include fields (dominated by patchy undifferentiated grasses); golf course (under intensive turf management); industrial/residential (maintained turf/lawns on industrial facilities and residential areas); recreational (playing fields, trap and skeet shooting range, and picnic areas); roadside turf areas (that parallel and are directly adjacent to roads); and airfield turf areas (that surround runways, taxiways, and tarmacs).

Definable areas of the Base have been categorized in terms of their suitability for certain developmental activities. Eight Management Emphasis Areas (MEAs) were developed based on mission-dependent development plans and natural resource management goals and objectives (EA 1995).

These MEAs (Appendix A, Figure 12) function as primary natural resource land management units and provide the framework for plan implementation by helping to determine appropriate locations for specific land uses and management practices.

MEA	Acres
1. Natural Habitat Preserve	755.5
2. Managed Natural Habitat	1,623.2
3. Natural Habitat Multiple Use	405.4
4. Development Reserve	179.0
5. Intensive Recreation and Training	323.3
6. Lake and Watercourse	74.4
7. BASH Reduction	1,126.9
8. Urban Development	2,581.6

People

Outdoor recreational opportunities on the Base are designed to meet the increased recreation demand by personnel and facilities and activities for watching wildlife (Appendix A, Figure 13).

AFI 32-7064 recognizes three kinds of recreation areas, which range from high development and high use to minimal development and minimal use (Appendix A, Figure 14). Class 1, general outdoor recreation areas, can accommodate intensive recreational activities and occupy about 350 acres of land Robins AFB. These areas include camping, a nature center, golfing, skeet and trap shooting, archery, group picnicking, and lake water sports.

Class 2, natural environmental areas, provide dispersed types of recreation such as trail use, fishing, birdwatching, jogging, riding, and hunting (Appendix A, Figure 14). In principle, these areas occupy approximately 4,000 acres of Robins AFB, although a large proportion of that is in the wetlands.

Class 3, special interest areas, have unique cultural, historical, scenic, or ecological features, but have not yet been fully defined for Robins AFB, except for locations of rare plants. In these areas, providing recreation opportunities must be consistent with protection of the features that make the area unique. The recreation areas on the Base are shown on the GIS maps included in Appendix A, Figures 13, 14 and 15.

Class 1 Recreation opportunities include: 18-hole golf course; model aircraft runway; a multi-station competition archery course; a three-hut Boy Scout and Girl Scout outpost; and civilian recreation facilities. Dispersed recreation opportunities (Class 2) include 34 miles of trails and equestrian facilities. There are 10 ecological sites and 25 cultural resource sites that comprise the Class 3 areas (unique ecological and cultural resource sites) at the Base. The cultural resource sites are described in the 1999 *Cultural Resource Management Plan* for the Base.

Most of the ecological sites are located near the southern end of the Base. These sites present an opportunity for environmental education and nature study activities.

Program Management

Natural resources program management includes integration with other AF programs, natural resources program assessments, assessing natural resources damage by other parties, and database development. In the event that natural resources under AF control are damaged by another party, such as by an accidental oil or chemical release, the installation must assess and claim damages. The Base must coordinate with MAJCOM, SAF/MIQ (the designated AF natural resources trustee), and AFLSA/JACE (AF legal).

The Integraph MGE-based GIS was installed at the Base to be used as an integral part of all natural resource management activities. This system currently is being converted to ESRI ArcView. The currently installed hardware and software represents a suite of tools that can be used to enter, access, analyze and plot mapped natural resources data. The natural resources data set contains data layers such as soils, wetlands, recreational areas, hydrography, floodplains, turfgrass areas, and other resources. Each graphical feature in each map is linked to a database table that contains descriptive information about that feature. Together they form a data layer.

In their current state, these data layers represent a starting point. Each data layer was derived from specific sources. The scale, accuracy, content, and date of each source is important and says a great deal about the reliability and usability of the resulting data layers. More detailed information has been included in the data sets when it is collected and additional data layers are developed to meet goals and objectives. These activities are part of the ongoing maintenance of the natural resource management GIS.

The natural resource management GIS contains adequate information so it can serve as a decision support tool for planners and decision makers. It contributes to overall better use and management of Base natural resources by making access to information about natural resources more efficient and accurate.